

WHAT IS CLAIMED IS:

1. A method for manufacturing a spark plug which comprises a tubular metallic shell, a tubular insulator extending in an axial direction of the metallic shell and fixed in the metallic shell with opposite ends of the insulator protruding from corresponding opposite ends of the metallic shell, a center electrode extending in the axial direction of the metallic shell and fixed in the insulator with a distal end of the center electrode protruding from a distal end of the insulator and with a rear end of the center electrode fixed in the insulator, and a ground electrode with one end of the ground electrode fixed to the metallic shell and with the other end portion of the ground electrode and the center electrode forming a discharge gap therebetween, and in which at least one of the center electrode and the ground electrode comprises an electrode base metal and a chip provided on the electrode base metal at a position for forming the discharge gap and formed of a spark erosion resistant material, the method comprising:

(1) providing a chip comprising a flange portion and a protrusion protruding from a first face of the flange portion;

(2) tentatively joining, through resistance welding, a second face of the flange portion opposite the protrusion to a joint face of the electrode base metal of at least either one of the center electrode and the ground electrode, the joint face being located on a side toward the discharge gap; and

(3) laser-welding the flange portion to the joint face such that a weld portion is formed between the electrode base metal and the chip to reach points on the second face of the flange portion, the points being located inward of corresponding intersections of the second face of the flange portion and imaginary extension lines of generatrices of a side surface of the protrusion.

2. The method for manufacturing a spark plug as claimed in claim 1, wherein the joint face is located on the electrode base metal of the ground electrode on a side toward the discharge gap.

3. The method for manufacturing a spark plug as claimed in claim 2, wherein, when D represents a maximum distance between the intersections, the weld portion is present so as to extend to a distance $D/5$ or more inward of the intersections as measured on the second face.

4. The method for manufacturing a spark plug as claimed in claim 1, which comprises providing in step (1) a plate-like intermediate member having at least one of a melting point and linear expansion coefficient falling between that of the electrode base metal and that of the chip, and having a face larger than the second face of the flange portion; and

in step, (2), providing the intermediate member between the joint face and the chip.

5. The method for manufacturing a spark plug as claimed in claim 4, which comprises, in step (2), after the intermediate member is tentatively joined to the joint face through resistance welding, tentatively joining the second face of the flange portion to the intermediate member through resistance welding.

6. The method for manufacturing a spark plug as claimed in claim 1, which comprises locating the joint face on the electrode base metal of the ground electrode on a side toward the discharge gap, and welding the chip to the ground electrode while the ground electrode is bent away from the distal end of the center electrode.

7. A spark plug comprising a tubular metallic shell, a tubular insulator extending in an axial direction of the metallic shell and fixed in the metallic shell with opposite ends of the insulator protruding from corresponding opposite ends of the metallic shell, a center electrode extending in the axial direction of the metallic shell and fixed in the insulator with a distal end of the center electrode protruding from a distal end of the insulator

and with a rear end of the center electrode fixed in the insulator, and a ground electrode with one end of the ground electrode fixed to the metallic shell and with the other end portion of the ground electrode and the center electrode forming a discharge gap therebetween, at least one of the center electrode and the ground electrode comprising an electrode base metal and a chip provided on the electrode base metal at a position for forming the discharge gap and formed of a spark erosion resistant material,

wherein the chip comprises a flange portion and a protrusion protruding from a first face of the flange portion; a second face of the flange portion opposite the protrusion is tentatively joined, through resistance welding, to a joint face of the electrode base metal of at least either one of the center electrode and the ground electrode, the joint face being located on a side toward the discharge gap; and the flange portion is laser-welded to the joint face such that a weld portion is formed between the electrode base metal and the chip to reach points on the second face of the flange portion, the points being located inward of corresponding intersections of the second face of the flange portion and imaginary extension lines of generatrices of a side surface of the protrusion.

8. The spark plug as claimed in claim 7, wherein the weld portion contains components of the chip in an amount in the range of from 20% by mass to 80% by mass.

9. The spark plug as claimed in claim 8, wherein the weld portion contains components of the chip in an amount in the range of from 30% by mass to 60% by mass.